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many interesting views of the dinosaur bones, the quarries and the scenery of the region in which they occur.

T. C. HOPKINS,

Corresponding Secretary.

DISCUSSION AND CORRESPONDENCE.

THE FALL OF BODIES.

THE report of Professor E. H. Hall on the motion of falling bodies recalls an interesting experiment. It was proposed by Newton in order to obtain a proof of the rotation of the earth. The experiment was made by Robert Hooke in 1680. Hooke dropped a ball 27 feet, and it fell toward the east and south. The most complete experiments have been made in Germany. Benzenberg dropped balls 235 feet, and found a small deviation to the south and a marked deviation to the east. His first sixteen trials gave a deviation to the north, but the last fifteen trials more than balanced this. Two years later Benzenberg repeated his experiments, and found a small deviation to the north. It appears to have been the erroneous investigation of this question by Olbers that led Gauss to examine the theory of this motion. Gauss says that, to his astonishment, he found by theory no deviation to the south. Afterwards Laplace examined this question ('Mec. Cel.,' Tome IV.) and found no deviation to the south. The most complete experiment is that of Professor Reich, who dropped balls 488 feet. From 106 trials the deviation to the east was 23.30 mm., and to the south 1.06 mm.

The result appears to be that the deviation to the east is decided, and that to the south or north is so small that it can be ascribed to errors of observation. The probable errors of the results are large. Perhaps good conditions for this experiment can be found in our country.

A. HALL.

February 4, 1903.

MOUNTAIN SPECTRE NEAR BOULDER, COLORADO.

THE term 'mountain spectre' is taken from the Encyclopedia Britannica, where it is noticed under the article 'Halo.' The best-known example is at the Brocken in the Harz Mountains. From the description of the phenomenon as observed at that place, it is in-

ferred that the appearance noted in Colorado was quite as distinct as that at that famous locality. It was observed February 1 from the top of Green Mountain, near Boulder, Colorado. This mountain is a high point in the foothill belt; its summit is 2,500 feet above the plains which it overlooks, or about 7,800 feet above the sea. On the day mentioned, at 4:30 P.M. patches of white cloud were drifting below its summit. Occasional snow flurries visited the plains below. The temperature was apparently below the freezing-point. At the hour of observation the sun, which was not more than twenty degrees above the horizon, was shining clear at the summit. Opposite the sun, a few hundred feet distant, was a mass of white or grayish cloud. Upon this cloud was seen a complete circle of rainbow colors. The diameter of the most pronounced red ring was estimated at nine degrees. Outside of this was a faint blue color, and then a suggestion of red in a still larger circle. Within the nine-degree red ring were blue and violet, the center appearing a dull lavender. In the field within the bright red ring appeared the shadow of the observer, which was so definite as to reproduce all movements of arms and hands. Each observer saw his own shadow and the reproduction of his own movements, and could see nothing of the shadow or movements of his neighbor if standing more than six or eight feet away. The phenomenon was watched about twenty minutes.

N. M. FENNEMAN.

UNIVERSITY OF COLORADO.

SIGNS OF THE GLACIAL PERIOD IN JAPAN.

IN my visit to Japan a few years ago I failed to find any distinct signs of glacial action, though I penetrated what seemed to be a typical place for extinct glaciers in the mountainous region one hundred miles northwest of Tokyo. But Mr. Yeihiro Ono, of the Bank of Japan, has just sent me a translation from a Japanese paper of some observations in the mountainous district a little farther south than that visited by me, which would seem to indicate that there are some relics of the glacial period in the central highlands

of Japan. The translation is interesting, not only as settling a fact of importance, but as indicating the alertness of the Japanese mind in prosecuting scientific inquiry. The article is from the *Zigi-shimpo* of November 5, 1902.

G. FREDERICK WRIGHT.

OBERLIN COLLEGE,
February 4, 1903.

Nobody has ever found a trace of a glacier in our country, and in fact it has often been doubted that one existed in Japan. Professor Milne, of England, who once held a chair in the Imperial University of Tokyo, even went so far as to deny its existence in Japan. It is, therefore, interesting to learn that Professor Yamazaki, of the Higher Normal School of Tokyo, recently found a trace of one on a mountain side in Shinano. When he was interviewed, he gave the following accounts of his discovery:

"The fact that America and Europe were once covered with ice is now beyond dispute; and recently we heard that traces of a glacier were found in Australia; and I have always held a theory that Japan is qualified to have a glacier, for the following reasons.

"1. There are several mountains as high as and above 3,000 meters.

"2. Many of them are covered with perpetual snow.

"3. The climate, being 'oceanic,' the amount of rain and snow is greater here than it is in Europe.

"4. In America, I found that the glacier region comes as far south as the lowest extremity of 37° 60' N. L. Now, Tokyo being on 35° 41' N. L., the middle part of the island along the coast of the Japan Sea corresponds with the glacier region in America.

"I had held this as a mere theory until last August, when I actually found traces of a glacier in one of the northwestern mountains.

"Last August, as a Committee on the 'Prevention of the Earthquake Disasters,' I climbed up a volcano, located on the boundary of three countries, Shinano, Yetchu and Yechigo; and when making investigations in Hida range, I actually fell upon a trace of a glacier on the side of Shira-Umaga-Take. This place, which is 2,900 meters above the

sea, forms a sort of valley, extending, say, for about 200 yards, and the layer of snow is about 20 yards deep. The sides of the valley are composed of slate-rock and sand. Pebbles and pieces of rock found on the mountain are unlike those which we generally find in ordinary mountains—smooth and striated. The rocks along the snow line are marked with grooves and the rock-floor is marked by the grinding work done by a glacier. In a still lower part of the valley, further down, I found stones and rocks traversed in every direction. I have found sufficient evidence to form a belief that here we have the proof of the existence of a glacier in Japan. The erosion is effected by the ice pressing against the sides, as it crept along, taking sand and stones which fell from the sides. If we should follow the range up to the province of Hida, I believe, we should find more valuable proof of the existence of glaciers. At any rate, we certainly have sufficient proof now for clearing the doubt of the existence of glaciers in this country.

"It is a strange coincidence, but a few days later, Professor Yabe found a zone of vegetation like that of the Alps and Chishima, in the very same place."—As he was interviewed by the editor of *Zigi-shimpo*.

November 5, 1902.

SHORTER ARTICLES.

TYPES OF PRE-LINNEAN GENERA.

INSTABILITY in the application of generic names is undoubtedly the most serious remaining deficiency of our current systems of biological taxonomy. To secure stability of specific names a definite rule of priority was sufficient because it had occurred to nobody to deny that the specimen first named and described should constitute the type of the species and determine the application of the specific name. With genera also stability is not to be secured merely by observing priority of dates, since it is necessary that writers agree upon the application of a name as well as upon its age; but by treating each generic name as inseparably attached to a single species as its nomenclatorial type, the law of